vintage visual

Basics of RA-4 printing with AGO Film processor

AGO FILM PROCESSOR

1. Intro

First, a big thank-you to Mario Mazzotta from Colla Lab, Italy, for sharing his deep knowledge of RA-4 printing. His experience has helped shape our approach.

This guide is a starting point for anyone interested in making RA-4 color prints at home. It focuses on the essentials needed to get consistent results using a color enlarger and the AGO Film Processor. While there are more advanced techniques out there, this will get you confidently through your first successful prints.

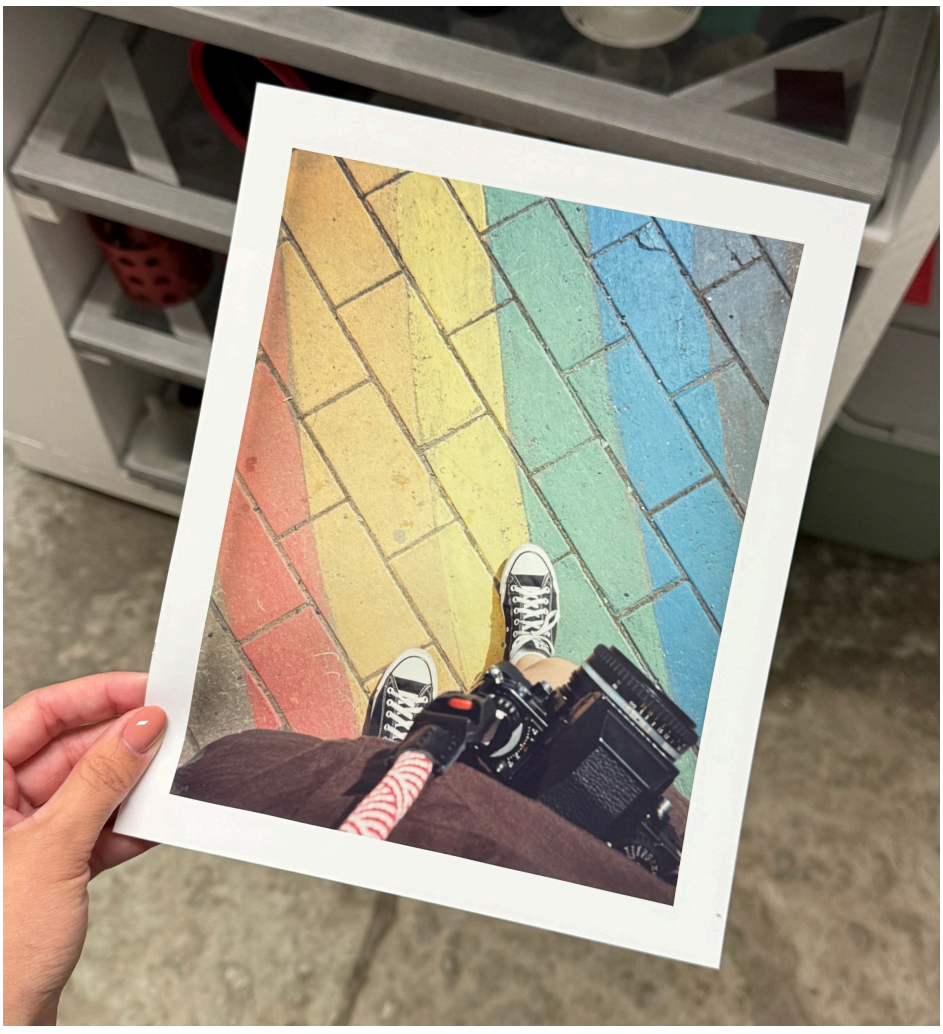
We've divided the instructions into three parts: Practical Theory, Enlarging, and Developing.

In the end there are some pro tips to get better consistency

1. Intro

Brief description of the process

1. RA-4 printing starts by loading your **C-41 color negative** into the enlarger. You adjust the projected image for correct size and focus. Once everything looks right, you turn off the lights, place a sheet of **RA-4 paper** under the enlarger, and expose it using the enlarger timer.
2. After exposure, the paper is loaded into a **Paterson tank** with a **Reel- paper 5**, allowing you to return to daylight for development.
3. The RA-4 process typically involves two chemical baths:
   - **Color Developer**
   - **Blix** (a combined bleach and fixer)
     Followed by a water rinse. After that, the print is fully processed.
4. Once you see your first result, you can adjust the exposure time, lens aperture, or fine-tune color balance using the yellow and magenta filters on the enlarger. You repeat and refine the process until you're satisfied with the final print.



2. Practical theory

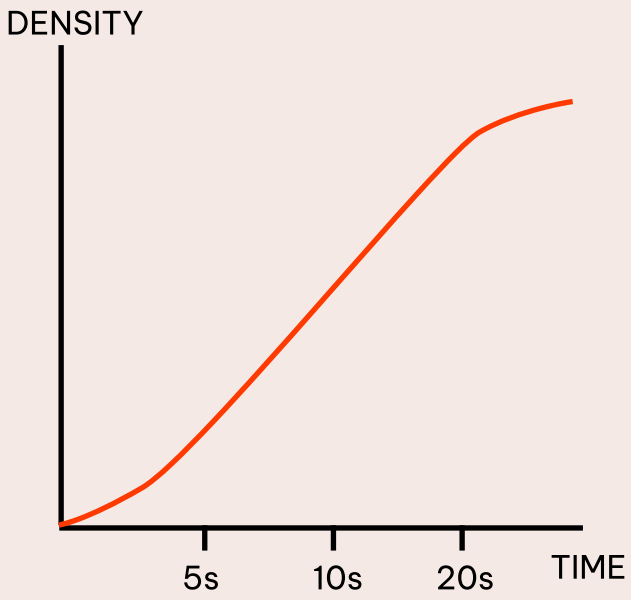
Exposure and making a test strip

1. Getting the **exposure right** is key to a successful print. One of the simplest and most effective ways to do this is by making a **test strip**. Instead of exposing the whole sheet of paper, you expose **different sections** for different amounts of time.
2. To do this, you cover part of the paper during the initial exposure and gradually uncover more of it in steps. This creates a strip with bands ranging from **too light (underexposed)** to **too dark (overexposed)**.
3. Start with **3-second intervals** between exposures, and aim to get about five patches on your strip. Set your **enlarger lens to f/8** for a good balance between sharpness and control.

Exposure test strip-
3, 6, 9, 11 and 13 seconds, 11 seconds was chosen for final print

2. Practical theory

After development, examine the test strip to see which section shows the best balance of tone and detail. Once you've found the best patch, use that exposure time for your full-size print.



Color correction

After your first test strip, the colors will likely be off. Getting color balance right can feel tricky at first, but with a bit of practice, it becomes surprisingly intuitive. You won't need any tools—just your eyes and a basic understanding of the **color wheel.**

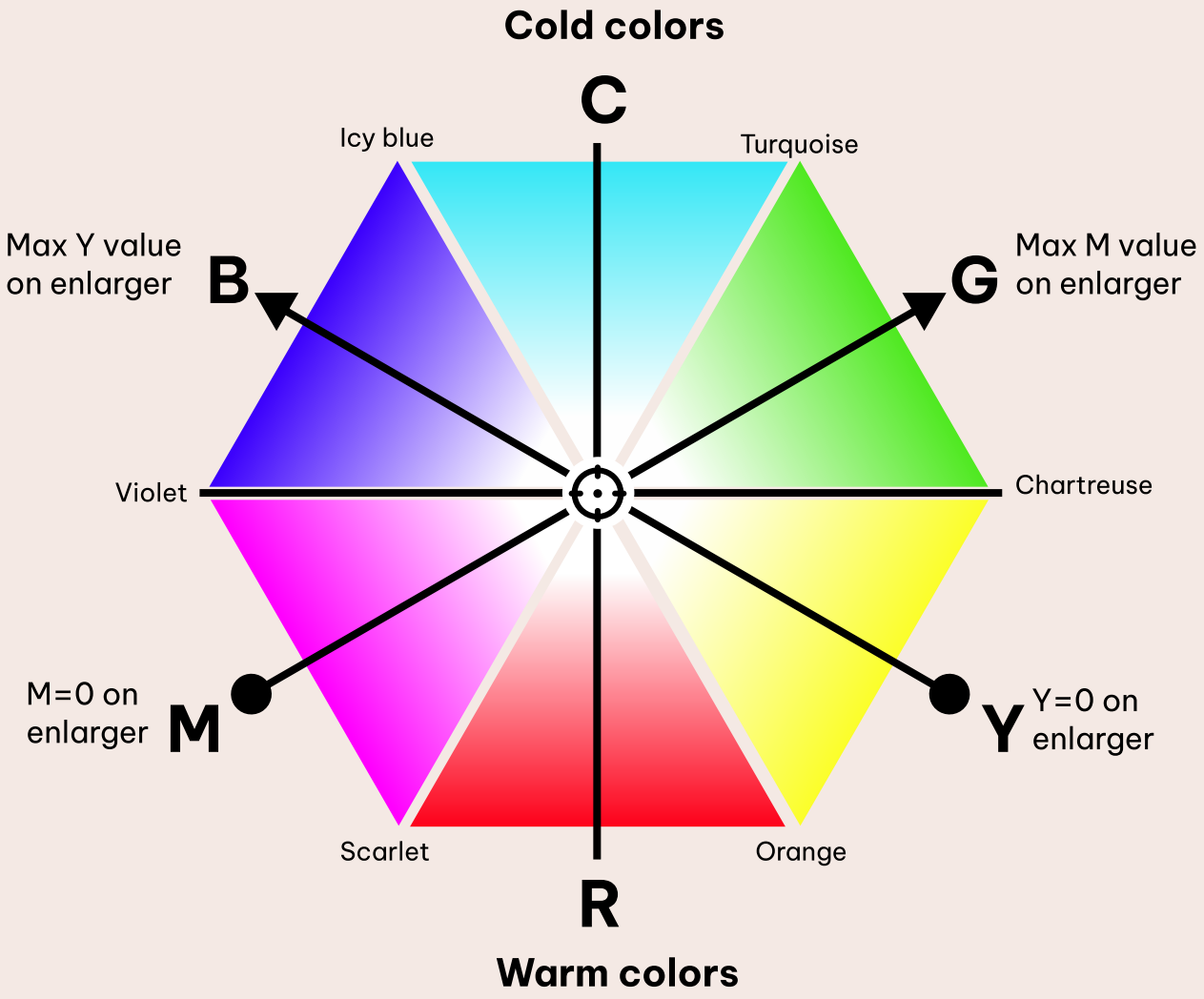
Good starting point on your color head:

- Magenta: 60
- Yellow: 60
- Cyan: 0 (we don't use cyan in RA-4 printing)

From this starting point, you'll fine-tune the color by adjusting **magenta** and **yellow** filtration based on what you see in your print. With experience, reading color shifts—especially in **neutral tones like skin**—becomes much easier.

3. Practical theory

RA-4 color wheel- we aim to the center



Examples:

1. Print is too Yellow: Increase the Y value on enlarger.
2. Print is too Red: Increase the M and Y value by the same amount.
3. Print is too Green: Decrease the M value
4. Print is Orange: Increase M and Y—but increase Y by twice as much as M

3. Practical theory

The test strip looked too orange, so we increased yellow by about 40 and magenta by 20 to shift the color balance toward neutral.

How to know if my color is correct

The easiest way to judge color balance in a print is by looking at **skin tones**. Human skin is very sensitive to color shifts, and our eyes are quick to notice if something looks "off." Regardless of a person's ethnicity or skin shade, **healthy skin tones should appear natural and warm**, without strange color casts.

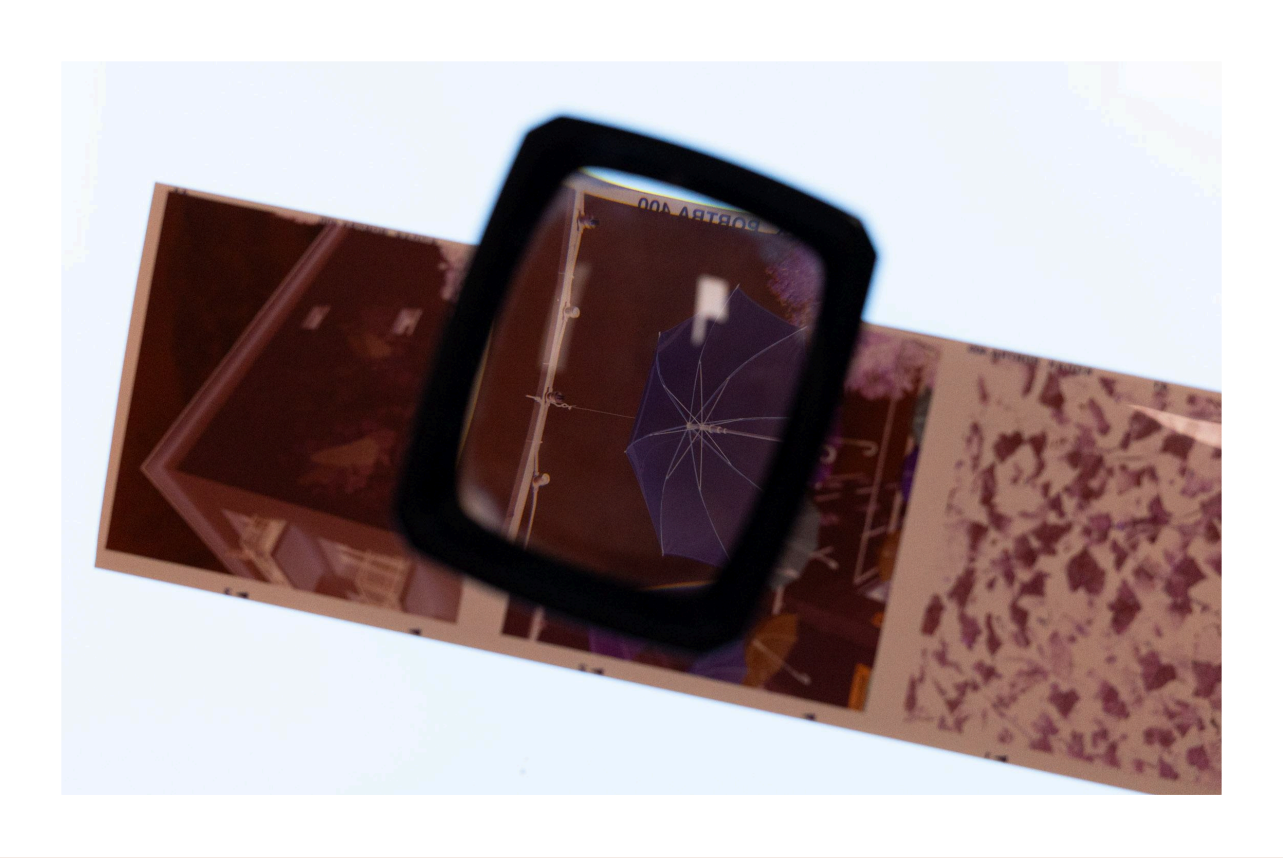
4. Enlarging guide

Preparing the negatives

Start by selecting **well-exposed C-41 negatives** with good density. This makes focusing, color correction, and overall printing much easier. Avoid negatives with a **transparent film base**, such as: Kodak Aerocolor (Santacolor, Flic Film- Elektra 100) or Harman Phoenix. These types don't have the orange mask typical of standard C-41 film and won't print correctly with normal RA-4 filtration.

1. Place the negative into the film holder with the **emulsion side facing down.**
- **Emulsion side**: The dull, matte side (facing down)
- **Base side**: The shiny side (facing up)

2. Use a **dust blower** to remove any particles—dust will show up in your final print.
3. Then, insert the film holder into the **enlarger**, making sure it's secure and properly aligned.



Reviewing negatives on a light table with a loupe before selecting what to print.

4. Enlarging guide

Adjust the print area and focus

1. **In total darkness**, take out one sheet of **RA-4 paper** in the size you plan to use. This sheet will be sacrificed to help set up your projection area.
2. Place the paper under the enlarger and **turn on the enlarger light**. Adjust the height of the enlarger head until the projected image is **slightly larger than the paper**—this ensures full coverage.
3. If you have a **masking frame**, use it to create a clean border around your print. If not, you can **tape guides** onto the enlarger baseboard to help you place the paper accurately in the dark.
4. Next, adjust the focus. Use a **focus finder** (grain magnifier) to focus on the grain of the negative as sharply as possible. This ensures your print will be crisp and detailed.

Make a testsrip

1. Enlarger settings
   - **Aperture**: F8
   - **Timer**: 3 seconds
   - **Color head**: Yellow 60, Magenta 60, Cyan 0
2. **Turn off the lights**.
3. Take a fresh RA-4 paper sheet. And close the paper container
4. Using the sacrificed paper from earlier as a mask, expose the test strip in steps—move the mask to uncover a new section every 3 seconds. Aim for **5 to 6 exposures** on the same sheet.
5. Roll the exposed paper (emulsion side inward) and load it into the **Paper 5 reel**.
6. Close the **Paterson tank** with the funnel.
7. **Turn the lights** back on

Now that you've made your first exposure, it's time to develop the print and see how it turned out.

Recap- Things you need for enlarging

1. Color enlarger
2. Dust blower
3. Focus finder (grain magnifier)
4. Masking frame (optional)
5. Well exposed C-41 negative
6. RA-4 paper

5. Developing guide

Default times:

- **Developer**: 45 seconds at 35 °C (we suggest doing it around 32 °C)
- **Blix**: 1 minute at 35 °C (also around 32 °C works well)
- **Wash**: Cold water rinse for 2 minutes
- Optional for final prints: Add stabilizer at the end.

Preparing the chemicals

You can use common RA-4 kits like **Arista, Bellini, Adox**, etc., which are designed for home users. These usually come in **2.5–5l kits**.

1. Mix the chemicals according to the manufacturer's instructions.
2. Store working solutions in **1l bottles**.
3. Place the bottles in a bucket of warm water and heat to **32 °C (90 °F)** using a sous-vide heater.

We deliberately go a few degrees below the official 35 °C (95 °F). This slightly slows down development, giving more consistent results.
*AGO processor will still run its standard program based on 35 °C settings—**you don't need to change times in AGO.***

4. Once the chemicals have reached the correct temperature, you're ready to start developing.

Everything that is needed for developing

5. Developing guide

Developing the RA-4 paper with AGO

1. **Attach the rear stand and AGO** to the Paterson tank. Press down firmly using your body weight to ensure a good seal.
2. **Place the unit horizontally** on a stable surface.
3. **Pour in minimum of 250 ml of developer**, then hit the Start button.
4. **Once the timer reaches zero**, pour the developer back into its storage container for reuse.
5. **Repeat the process** with the blix and then the wash.
6. **Take out the print**, evaluate the result, and set it aside to dry.

Now you have your first print. Most likely, it won't be perfect—but that's the point. Use it to judge exposure and color balance, then go back to the enlarger to make corrections.

It might take 5–10 prints before everything clicks. But as you practice, you'll get faster at understanding how much to adjust each color channel. A useful tip: early on, make bold changes—turn yellow and magenta by 30 units or more. This helps you clearly shift the image toward the opposite color and make more confident decisions in the next step.

Recap-Things you need developing

1. AGO film processor
2. Paterson 5 or 8-reel tank
3. REEL–Paper 5 (for holding RA-4 paper)
4. RA-4 developing kit (e.g. Arista, Bellini, Adox)
5. Sous vide heater (highly recommended for stable temperature)
6. Bucket (for warming chemicals)
7. Two 1l storage bottles (one for developer, one for blix)
8. Running water

6. Pro tips

Chemical replenishment

At home, RA-4 printing is often done using rotary tube processors, where the print is inserted directly into a drum that rotates. This method typically uses about **50 ml of chemicals per print**, and the chemistry is usually treated as **one-shot**—discarded after each use.

With the **AGO processor** and **Paper 5 insert**, the minimum required volume is **250 ml** per step. Discarding this after every print would be wasteful.

In practice, you can reuse the same 1l of developer for at least **15 prints** without noticeable quality loss. However, for even more consistent results, there's a method: chemical replenishment.

Instead of discarding the used chemistry, just **replace some of it with fresh chemistry** after each print. This keeps your developer and blix active, extending their usable life while ensuring uniform results from the first to the last print in a batch.

Precise replenishing rates depending on paper size:
Use these values to keep developer and blix activity consistent. **These are safe replenishment amounts** — some manufacturer's datasheets list lower values, but this gives you a more reliable margin, especially for home use.

Paper Size	Developer	Blix
4×6" (10.2 × 15.2 cm)	8 ml	4 ml
5×7" (12.7 × 17.8 cm)	11 ml	6 ml
8×10" (20.3 × 25.4 cm)	26 ml	13 ml
9.45×12" (24 × 30.5 cm)	35 ml	17 ml
Per 1 sq. ft	46.5 ml	23 ml
Per 1 m^2	500 ml	250 ml

6. Pro tips

Thinking in F-stops

In the darkroom, it's tempting to adjust exposure in seconds—3, 6, 9. But seconds are linear, and photographic exposure is not. What you really need is a consistent way to control light. That's where f-stops come in.

Why Seconds Mislead
Doubling time from 5 to 10 seconds adds one full stop. But going from 10 to 15 seconds only adds half a stop. So, adjusting in seconds gives you inconsistent exposure jumps, making test strips and fine-tuning unpredictable.

F-Stops Give You Control
F-stops work on a doubling/halving scale. Each full stop doubles or halves the light. If your base exposure is 8 seconds:

- +1 stop = 16 seconds
- −1 stop = 4 seconds
- +2 stops = 32 seconds

No matter where you start, each stop change has the same visual effect—more predictable, more repeatable. Think in stops, not seconds, and you'll print smarter.

5s + 2s → 1/2 stop darker
20s + 2s → 1/10 stop darker

Notes for dogging and burning in f-stops

6. Pro tips

Dogging and burning

Dodging and burning are simple but powerful techniques for adjusting the brightness of specific areas in a print. Sometimes parts of a print come out too light or too dark—dodging and burning let you fine-tune those areas without affecting the rest of the image.

- **Dodging** means **blocking light** during part of the exposure to make an area **lighter**.
- **Burning** means **giving extra exposure** to a part of the image to make it **darker**.

How to Do It

- **Dodging**: Use your hand or some sheet to block light from a specific area during the main exposure. Keep it moving slightly to avoid hard edges.
- **Burning**: After the main exposure, cover the rest of the image with your hand, and uncover only the area you want to darken. Add more exposure time to that section. Move the card subtly to feather the edges.

Tips

- Moving your hand higher above the paper creates a larger, softer shadow for broader areas. Holding it lower gives you more control over smaller spots. Keep it moving to avoid hard edges.
- Always keep your dodging/burning tool **moving** to avoid visible lines.
- Start with **small time adjustments** (like +½ stop for burning).
- **Practice** a few times without paper to get the motion and timing right.
- Write down your steps so you can repeat them reliably.
- Try to keep exposure times above 20 seconds — it gives you better control.

6. Pro tips

Pre-Exposure in RA-4 Printing

Pre-exposure, also called "flashing," is a technique where you give the paper a small amount of light before the actual image exposure. This can help bring out shadow detail in very dark prints and reduce harsh contrast, especially in high-contrast negatives.

Why Use Pre-Exposure?
Some color negatives—especially those with strong contrast—can produce prints where the shadows are too deep or lack detail. Pre-exposing the paper helps raise the baseline exposure just enough to make those dark areas more printable, without affecting midtones or highlights too much.

How to Do It

1. Use a plain light source like the enlarger with no negative or a blank area of the film.
2. Keep it low—typically 1–3 seconds at a small aperture (e.g. f/11 or f/16).
3. Do it before the main image exposure.

It's best to experiment. Too much pre-exposure will fog the paper and lower overall contrast too far. Just a touch is often enough.

When It's Useful

- Printing contrasty negatives
- Preserving shadow detail
- Reducing color cast in very dark areas

Ending notes

Last but not least:
Make notes—exposure time, filter settings, lens aperture—so it's easier to replicate the same picture next time.

And enjoy the process. Few things beat the feeling of seeing your photo come alive in color, by your own hands.

Thank you for reading

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